

Final September 2003

# **FISHERIES MANAGEMENT AND EVALUATION PLAN**

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**Lower Columbia Steelhead ESU**

**Hood River Basin**

**Steelhead, Trout and Salmon Fisheries**

**Prepared by  
Oregon Department of Fish and Wildlife**

**September, 2003**

**Title.**

**Fishery Management and Evaluation Plan:**

Lower Columbia River ESU  
Hood River Fisheries.

**Responsible Management Agency.**

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**Date Completed:** March, 2001 (Updated September 2003)

**SECTION 1. FISHERIES MANAGEMENT**

**1.1) General objectives of the FMEP.**

The general objective of this FMEP is to conduct a consumptive sport fishery on hatchery steelhead consistent with recovery of the ESA listed steelhead. This FMEP includes all freshwater sport fisheries, which affect or could potentially affect the survival and recovery of listed steelhead in the Hood River subbasin.

Specific objectives are to:

1. Recover naturally produced steelhead to maximum sustainable levels. A goal of the Hood River Production Program (HRPP) is to rebuild naturally sustaining populations of summer and winter steelhead in the Hood River and to maintain the genetic character of salmonids in the subbasin (O'Toole and ODFW, 1991).
2. Provide harvest of hatchery steelhead in numbers and ways that do not jeopardize the survival and recovery of listed steelhead in the Lower Columbia, Middle Columbia and Snake River ESU's. The intent of this FMEP would be to continue the current harvest management.
3. Provide fisheries for trout, Chinook salmon, and coho salmon that do not jeopardize the survival and recovery of listed steelhead in the Lower Columbia, Middle Columbia and Snake River ESU's. The intent of this FMEP would be to continue the current harvest management.

**1.1.1) List of the “Performance Indicators” for the management objectives.**

The performance indicator for Objective 1 will be escapement of naturally produced steelhead past Powerdale Dam on Hood River (See sections 1.3.1 & 1.3.2 for thresholds).

An upstream migrant adult fish trap (Powerdale trap) was installed by the Oregon Department of Fish and Wildlife (ODFW) at Powerdale Dam in December, 1991. Powerdale Dam, which is owned and operated by PacifiCorp, is located at river mile 4.5 in the mainstem Hood River. The original trap facility and now a new facility put on line in early 1997 are components of the monitoring and evaluation portion of the HRPP. The overall goal of the HRPP is to re-establish or rebuild naturally sustaining anadromous salmonid runs in the Hood River basin via a combination of supplementation, habitat improvements, and a monitoring and evaluation program (BPA, et al 1996). The Powerdale trap allows for total counts of all upstream migrating fishes and will be a key component in meeting and measuring not only the objectives of this FMEP but the goals and objectives of the HRPP.

The performance indicator for objectives 2 and 3 will be steelhead harvest and catch estimates based on angler effort, harvest and catch data collected in the lower 4.5 miles of the Hood River as part of a statistical harvest program associated with the monitoring and evaluation of the HRPP. Data are collected on landings of wild and hatchery steelhead by sport anglers. Tribal fishers do not currently harvest steelhead in the Hood River. Harvest sharing agreements yet to be formalized between ODFW and the Confederated Tribes of Warm Spring Reservation of Oregon (CTWSRO) will identify specific allocation of returns above escapement needs and location of Indian and non-Indian fisheries in the Hood River (O’Toole and ODFW, 1991).

**1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs.**

***Harvest Management***

Angling for steelhead in the Hood River has historically been popular and productive. The Hood River was in the top 10 list of Oregon’s most productive steelhead rivers (as measured by harvest card catch) for many years.

Historically, much of the Hood River subbasin, except the East Fork upstream from the Middle Fork confluence and a portion of the West Fork Hood River, was open to adult steelhead angling. The West Fork Hood River was recognized as important holding and spawning water for summer steelhead and for many years was closed to all angling from Punchbowl Falls (river mile 0.5) to Dry Run Bridge (river mile 8.5). The reach of the West Fork Hood River from Dry Run Bridge upstream to its headwaters was open to fly angling only from July 1 to October 31 each year. Season and gear restrictions were thought to provide a degree of protection to wild

summer steelhead in the area. The angling closure on the East Fork Hood River provided a large sanctuary area in recognition of the importance of that area for winter steelhead production.

Natural bait was legal for many years in the remainder of the Hood River system that was open to angling and only general tackle restrictions were in effect. More restrictive regulations designed to protect naturally produced steelhead were implemented starting in the early 1990's.

Following the statewide trend in wild steelhead protection, mandatory wild release regulations went into effect on the entire Hood River subbasin on 1 January, 1991. As an artifact of that regulation, steelhead angling was allowed in 1997 and 1998 without special gear restriction in the entire Hood River system (except two Middle Fork Hood River streams closed for bull trout protection) Due to changes in hatchery fish management and philosophy, however, all steelhead angling in the Hood River and tributaries upstream from Powerdale Dam was closed on 1 January, 1999

Steelhead angling is open year around from Powerdale Dam downstream to the Hood River-Columbia River confluence; all other subbasin waters are closed to the take of steelhead. This open area makes up only 4.1 % of the Hood River watershed. Two hatchery steelhead can be retained per day with a current statewide season limit of 20 fish in effect. The West Fork Hood River and tributaries are closed to all angling. Mandatory wild steelhead release regulations are in effect downstream from Powerdale Dam.

Angling regulations currently in place throughout large portion of the Hood River watershed provide significant protection to juvenile salmon and steelhead. All trout fishing in Hood River and tributaries open to angling (the West Fork Hood River and all tributaries are closed to angling year around) is restricted to late May to 31 October. Trout fishing in the Hood River subbasin is further restricted to catch and release angling with only artificial lures permitted as terminal tackle. This artificial lure, catch and release regulation is in place in 69.8% of the Hood River watershed. Additionally the West Fork Hood River and tributaries, which make up the remaining 30.2% of the total watershed area, are closed to all angling. These regulations are believed to provide a high degree of protection to juvenile steelhead.

Chinook and coho salmon are also present in the Hood River and are subject to sport harvest from Powerdale Dam downstream to the mouth of the Hood River. Coho are legal to harvest the entire year while Chinook can only be harvested by sport anglers from 1 August to 31 December each year. Relatively few coho and Chinook are present in the Hood River annually and little or no target sport fishery exists for these species. Gear restrictions in place to minimize wild steelhead mortality would apply when angling for these fishes regardless of time of year. Wild steelhead release is in effect year around. The presence of these species and angling for them likely does not contribute to measurable additional mortality to listed steelhead. Sport angling impacts to ESA listed Chinook salmon are addressed in the Lower Columbia River ESU Chinook FMEP.

Harvest and catch of the different components of summer steelhead runs in the Hood River have been estimated by statistical harvest estimation procedures as a component of the HRPP since 1996. Statistical harvest estimates have been calculated for fisheries taking place from the mouth upstream to Powerdale Dam. These estimates would describe all sport angler catch and effort on the portion of the Hood River open to harvest of adult salmonids.

Creel surveys are conducted on the Hood River year around. Two levels of stratification (day type and two week period) are used in summarizing the data and estimates of catch, catch rate, and effort are calculated for both strata. Sampling days are categorized as either a weekend-holiday or weekday. Total catch is summarized by two-week periods that encompass the first through the fifteenth and the sixteenth through the end of the month. Generally, 40% to 80% of the weekdays and 40% to 90% of the weekend-holiday days are sampled each two-week stratum. All estimated parameters are bounded by 95% confidence intervals as a measure of the precision of the data. Managers believe data yielded by this work is sufficiently accurate and precise to base management decision on.

In summary, significant and wide-reaching regulations are currently in place to protect naturally produced steelhead in the Hood River subbasin. Current harvest objectives are to provide anglers harvest opportunity on hatchery steelhead greater than that which would be available from the wild production alone while not jeopardizing the survival and recovery of listed summer steelhead in the Middle Columbia and Snake River ESU's.

### ***Artificial Production Programs***

The Hood River has a long history of hatchery steelhead stocking. A variety of out of subbasin, non-locally adapted hatchery steelhead juveniles were historically released into the Hood River subbasin. For example, Oregon's Foster (Skamania) stock was used for over 30 years in the West Fork Hood River to augment angler harvest of summer steelhead. Additionally, Oregon's Big Creek stock winter steelhead were used for several years in both the East and Middle forks, also to increase angler catch rates. These steelhead stocks, we now know, are genetically dissimilar from the native stocks, and while some genetic interaction between the native and introduced stocks is thought to have taken place, the result of these interactions is unknown.

More recently, significant and wide-reaching changes in artificial propagation programs have been enacted in the subbasin to ensure that stocking of hatchery steelhead is compatible with conserving and recovering listed steelhead. Important direction guiding these changes in hatchery fish use was provided by Oregon's Wild Fish Management Policy (OAR 635-007-0525 through 635-007-0529). The purpose of the current hatchery program is to provide genetically appropriate steelhead for supplementation of the wild runs as a component of the HRPP and to provide sport and tribal harvest of hatchery steelhead. Presently, hatchery steelhead derived from wild Hood River stock contribute to fisheries downstream from Powerdale Dam. These genetically appropriate stocks are currently passed upstream from Powerdale Dam in accordance

with Oregon's Wild Fish Management Plan to supplement the wild runs and may be used for harvest augmentation in the future. Foster (Skamania) stock juveniles are currently released downstream from Powerdale Dam and adults returning from these releases are intended to provide harvest augmentation in that area.

As a component of the HRPP, the historic winter steelhead hatchery program was changed to one utilizing local wild fish for broodstock. This changeover was started with the 1992 brood year and continues to the present time. Broodstock are selected randomly throughout the run timing and are collected without attention to specific phenotypic character. Significant consultation with genetic experts has taken place and continues to occur to ensure that this hatchery program poses an acceptable risk to the naturally producing population.

Juveniles from this program are reared and released using strategies that are thought to minimize risks to the naturally producing population. Examples of these strategies include not grading juveniles in the hatchery, acclimating smolts to specific areas in the subbasin, utilizing volitional releases from acclimation, using camouflaged ponds and in-pond structures during acclimation to more closely approximate nature and trucking non-migrants from acclimation sites rather than force releasing potential presmolts.

Hatchery winter steelhead though to be genetically dissimilar to the wild population have not been allowed access upstream from Powerdale trap since 1992. This policy will continue into the future and hatchery winter steelhead that can be identified through fin mark to be strays to the Hood River will not be allowed upstream from Powerdale trap. Hatchery winter steelhead resulting from the native broodstock program that were thought to be genetically similar to the wild population were first passed upstream from Powerdale trap into the spawning population starting in 1995. The number of hatchery winter steelhead allowed to pass upstream from the Powerdale trap into the spawning population is governed by Oregon's Wild Fish Management Policy and for winter steelhead, does not exceed 50% of the spawning population.

Similar and even more aggressive protection strategies are currently in place with summer steelhead in the Hood River. These strategies are also components of the HRPP and are guided by Oregon's Wild Fish Management Policy.

Releases of Foster (Skamania) stock juveniles upstream from Powerdale Dam were discontinued after 1997, eliminating the potential for hatchery fish interaction with wild juveniles. All Foster (Skamania) stock juveniles are released downstream from Powerdale Dam to provide a sport fishery in the lower river on returning hatchery origin adults.

All Foster (Skamania) stock hatchery adult summer steelhead have been excluded from the spawning grounds upstream from the Powerdale trap since early August, 1997, in recognition of potential genetic harm and ecological competition their continued presence may cause. This policy continues to present and all Foster (Skamania) stock adults returning to the Powerdale trap are recycled through the sport fishery.

A summer steelhead wild broodstock program similar to that described above for winter steelhead was started in 1997-98 return year (98 brood year).

All hatchery steelhead released in the Hood River subbasin are differentially fin marked to identify them from wild and stray hatchery steelhead both for angling and management purposes.

Native Hood River spring Chinook were extirpated and replaced with Carson stock spring Chinook in 1986 and later with Deschutes stock spring Chinook. Approximately 100,000 hatchery spring Chinook are released into the West Fork Hood River and approximately 35,000 are released into the Middle Fork Hood River each year. All Chinook juveniles are acclimated to subbasin water prior to release and non-migrants are trucked to the mouth of the Hood River. This is thought to decrease competition with native fishes in the wild.

No hatchery coho or fall Chinook are released in the Hood River.

Finally, up to 17,000 hatchery legal rainbow were historically stocked in the East Fork Hood River each year to provide a consumptive angling opportunity for trout anglers. This program was discontinued after 1996 in recognition of potential ecological harm and fishery impacts these releases could create on juvenile steelhead.

**1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations.** (This will be further addressed in section 4).

The ceded lands of the CTWSRO contain the entire Hood River subbasin. A treaty between the US government and the three tribes comprising the CTWSRO guarantees tribal members the exclusive rights to fish in waters on and bordering the Warm Springs Reservation. In addition the treaty guarantees that tribal members retain fishing rights within their ceded lands. The Warm Springs Tribal Council regulates off-reservation tribal fishery harvest.

As a component of the HRPP, ODFW and CTWSRO will develop harvest plans to outline the catch apportionment of adult salmonids returning to the Hood River at various run sizes. This plan does not address in-river tribal harvest. Tribal harvest will be included in other agreements or plans. Harvest impacts proposed in this FMEP will be consistent with and will not preclude proposed future harvest of Hood River steelhead by tribal co-managers. The actions and objectives of this FMEP are subject to and are consistent with provisions of the Columbia River Fish Management Plan (*US v Oregon*).

**1.2) Fishery management area(s).**

**1.2.1) Description of the geographic boundaries of the management area of this FMEP.**

The steelhead, salmon and trout fisheries associated with this FMEP currently take place in the lower 4.5 miles of the mainstem Hood River. In addition, the catch and release trout fishery described above takes place in the mainstem and tributaries upstream of Powerdale Dam (except the West Fork Hood River and tributaries which are closed to all angling).

**1.2.2) Description of the time periods in which fisheries occur within the management area.**

Upstream migrating adult steelhead are present year round in the FMEP management area. Additionally, the reach of river from the mouth upstream to Powerdale Dam is open to steelhead angling year round. Sport angling for steelhead has one major activity period in the Hood River. Winter steelhead are present in fishable numbers starting in February and continuing through May. Bright summer steelhead start to enter the Hood River in March and continue throughout the summer. Angler effort peaks in May and June in response to this overlapping abundance. The Hood River becomes turbid from glacier meltwater contributed by the East Fork and Middle Fork by early July each year and angler effort decreases dramatically. Clear water usually returns by mid-October of each year but angler interest remains low until the following February when good numbers of winter steelhead arrive.

All trout angling upstream and downstream from Powerdale Dam is restricted to the period starting on the fourth Saturday in May to 31 October and is catch and release with no bait allowed. These restrictions maintain hook and release mortality on juvenile steelhead at levels well below those that would jeopardize the survival of the wild Hood River steelhead.

Chinook and coho salmon are also present in the Hood River and are subject to sport harvest from Powerdale downstream to the mouth of the Hood River. Coho are legal to harvest the entire year. Chinook can only be retained by sport anglers from 1 August to 31 December each year. Relatively few coho and Chinook are present in the Hood River annually and little or no target sport fishery exists for these species.

**1.3) Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2.**

The FMEP management area is located within the Lower Columbia River Chinook ESU, listed as threaten ( March 24, 1999). Native Hood River spring Chinook were extirpated, and replaced with Carson stock spring Chinook in 1986 and later with Deschutes stock spring Chinook. These spring Chinook are not listed under the ESA.



ESA listed steelhead present in the Hood River FMEP are part of the Lower Columbia River ESU and are managed as separate summer and winter populations in the subbasin. In addition, there is the potential for stray summer steelhead from the Middle Columbia and Snake River ESUs to be present in Hood River. Hatchery summer steelhead from the Snake River ESU are known to commingle with Hood River stocks in the lower 4.5 miles of the Hood River. Stray hatchery summer steelhead, as identified by fin mark, are however quite uncommon, totaling less than 2% of the capture of hatchery summer steelhead at the Powerdale trap. Hatchery winter steelhead from other programs are also known to commingle with Hood River stocks in the lower 4.5 miles of the Hood River. Stray hatchery winter steelhead are also infrequently captured at the Powerdale trap. These fish, as determined by fin mark, may total up to 5% of the hatchery winter steelhead captured at the Powerdale trap. None of these hatchery fish have been listed under the ESA or considered essential for the recovery.

**1.3.1) Description of “critical” and “viable” thresholds for each population (or management unit) consistent with the concepts in the technical document “Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units.”**

These threshold values, as described by McElhany et al. (2000), could not be fully estimated due to lack of sufficient time series data for the populations in question (Table 1). Further, the current carrying capacity or production potential for summer or winter steelhead in the Hood River subbasin is unknown. Each race is managed as a separate population in the Hood River subbasin. Data will be gathered by the HRPP monitoring and evaluation program to further address these data gaps. Additionally, data gathered during the term of this FEMP will allow managers to more accurately and precisely estimate critical and viable threshold values for both summer and winter steelhead. No changes are expected to the management of steelhead fisheries in the Hood River if the listed populations rebound to healthy abundance levels (i.e. selective fisheries for hatchery fish only continue), viable threshold levels do not need to be specified in this FMEP.

In the absence of these definitive data, it is possible, however, to use other information to define interim critical thresholds for summer and winter steelhead. Hood River fish managers are comfortable with this interim approach for several reasons. First, the Powerdale trap makes it possible to count with absolute accuracy and precision each returning adult steelhead. This removes considerable uncertainty surrounding many other enumeration techniques that rely on estimates of passage or redd count data to count returning adults. Second, the Powerdale trap allows managers to positively control the number of hatchery fish that are allowed into the spawning grounds. Depending on the population assessment at any point in time, we have the ability to pass either a higher or lower number of hatchery fish upstream into the spawning grounds. For example, if population levels are very low and it is collectively decided that a boost to the spawning population is required using genetically appropriate hatchery steelhead, they can be passed upstream in precisely controlled numbers to accomplish the desired objective. Conversely, if a determination is made that hatchery-wild interactions on the spawning ground

are inappropriate for genetic or ecological reasons, this objective too can be accomplished with certainty. This is a unique situation for fish managers and one that increases the comfort level even in the absence of definitive data.

Even though insufficient data are available to calculate critical threshold values for Hood River steelhead, estimates of both summer and winter steelhead escaping upstream from Powerdale Dam exist annually since 1992. Estimated escapement of wild summer steelhead escaping past Powerdale Dam ranges from 65 to 477 and averages 195 for the period of record (Tables 2). Estimated escapement of wild winter steelhead past Powerdale Dam ranges from 194 to 678 and averages 336 for the period of record (Table 3). These escapement estimates are important to consider when discussing the following proposed critical thresholds.

An explanation of Hood River steelhead run year and our summary of steelhead data may help readers with tables 2 and 3. A summer steelhead run year in Hood River can be 15 months long and, as result, bright steelhead of the new run year and mature, dark steelhead from the current or past run year overlap in the river for several months (Table 2). This makes it necessary to report long time series data to the point where the summer steelhead table takes up two pages, one page reporting March through December of one calendar year while the other reports January through May of the next calendar year. Winter steelhead are somewhat more straight forward and have a much shorter period of return (Table 3). The number of origin categories we assign returning adults to and the length of the data string, however, require two pages to display.

With the safeguards discussed above as a backstop, managers reviewed other summer steelhead populations and their critical threshold values for similar populations in Oregon. Critical thresholds from the Umatilla, South Santiam, Sandy and Clackamas were reviewed to provide guidance for Hood River values (Chilcote 2001). This review suggests that, until additional data is gathered, an interim critical threshold of 100 wild summer steelhead passing Powerdale Dam be adopted as the threshold number that would trigger additional conservation actions. Summer steelhead escapement levels have been less than the critical threshold level one year during since 1992 (Table 2). Additional conservation actions designed to lower hook and release mortality to maintain abundance above the critical threshold could include reduced season length, reduce open area or further terminal tackle restrictions. Failure to meet critical threshold abundance would likely trigger a total closure of fishing for all or part of the summer steelhead run timing. The wild summer steelhead run past Powerdale Dam has fallen below the proposed critical threshold one year for the period of record (Table 2).

We feel the proposed summer steelhead threshold values represent a conservative approach for several reasons. Analysis presented in this FMEP demonstrates that hook and release mortality in the Hood River is very low. Under a worst-case scenario, less than 2% of the annual wild steelhead return could potentially be lost to hook and release mortality. It is unlikely that hook and release angling mortality is now or will be in the future an important component of Hood River steelhead mortality.

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Current wild summer steelhead production in the subbasin may have been held artificially low due to many years of hatchery–wild fish interactions on the spawning grounds. Foster (Skamaina) stock hatchery summer steelhead were allowed into the spawning grounds for at least 30 years and it is possible that genetic interactions between the two groups may have lowered the production potential of the wild population. In addition, it is also likely that ecological interactions between hatchery juveniles released into the principle production areas for wild summer steelhead may have resulted in lower production of wild smolts and subsequent adults. Foster (Skamaina) hatchery summer steelhead adults have not been allowed into the spawning grounds after August 1997 and Foster (Skamaina) hatchery summer steelhead juveniles have not been released upstream from Powerdale Dam after 1997. The wild summer steelhead population may be starting to recover from those impacts and may currently be in transition to higher levels of production. These factors acting in concert may mean that the true critical threshold values are higher than those interim values presented here.

The process used to determine critical threshold levels for wild winter steelhead is similar to that described above for summer steelhead. Based on these analysis, we would propose an interim wild winter steelhead critical threshold of 200 individuals measured as escapement above Powerdale Dam. Wild winter steelhead returns have been lower than the proposed interim critical population threshold one year during the period of record (Table 3). Reaching the threshold under the terms of this FMEP would trigger conservation actions for winter steelhead similar to those described above for summer steelhead.

It is likely that more accurate critical values can be estimated for Hood River populations after collecting additional data. Given the nature of the data collected, long time series may not be needed. The HRPP monitoring and evaluation program collects data that are accurate, precise and robust. For example, all adults escaping to Powerdale trap are counted with precision. Age data is collected from each escaping adult making assignment of brood year possible for wild steelhead. Harvest estimates from the mouth upstream to Powerdale Dam are generated to account for angler harvest of hatchery steelhead, making accurate smolt to adult return calculations. Estimated of the number of outmigrating juvenile steelhead are made for each fork and the mainstem Hood River to estimate juvenile production and carrying capacity. Additionally, the Technical Review Team will make important contributions to the process of identifying future estimates of the viable and critical threshold levels.

We feel that on a qualitative basis, both summer and winter populations are healthier than these proposed interim critical threshold values, since both populations continue to respond to common environmental variables thought to place selective pressure on steelhead throughout their range in Oregon. Each race is managed as a separate population in the Hood River subbasin. Chilcote (2001) forwards the hypothesis that the observed cyclical pattern of productivity and abundance of steelhead populations (such as those in the Hood River) are the result of ecological fluctuations in the marine environment rather than annual variations in the freshwater environment. Steelhead populations in the Hood River continue to respond to these out of subbasin environmental variations, suggesting that the population remains greater than the critical threshold value.

An additional indicator of population health is estimated density of juvenile rainbow-steelhead in selected Hood River tributaries. Olsen and French (1997) estimated densities of juvenile rainbow-steelhead in several streams in the Hood River subbasin. This work was conducted as a component of the monitoring and evaluation portion of the HRPP. Sample streams were selected based on two primary criteria: (1) the stream had habitat that was potentially accessible to anadromous salmonids and (2) the randomly selected reaches of stream could be sampled effectively to estimate the true populations of fishes in questions.

Each sample reach was 60 meters in length and either two or three pass removal estimates were conducted utilizing block nets on both ends of the sample. Density estimates were made on sample streams in years 1994 through 1997. Separate population estimates were made for rainbow-steelhead less than and greater than or equal to 85 millimeters fork length. Past sampling suggests that those individuals greater than or equal to 85 millimeters fork length are greater than age 1.

Sampling of streams thought to best represent the primary criteria outlined above resulted in average densities of rainbow-steelhead greater than or equal to 85 millimeters fork length ranging from 0.046 fish per meter square to 0.149 fish per meter square. The density values for Hood River streams are either equal to or up to three times greater than values reported by Satterthwaite (1999) as benchmarks for population health goals in the Klamath Mountain Province. These data strongly suggest that the Hood River steelhead population strength is greater than the viable threshold.

In summary juvenile steelhead appear to be present in densities that suggest healthy populations and adult numbers fluctuate around environmental variables that similarly effect other Oregon populations. We believe, therefore, that the interim threshold values proposed here will more than adequately protect wild summer and winter steelhead in Hood River from additional sport angler induced hook and release mortality.

**1.3.2) Description of the current status of each population (or management unit) relative to its “Viable Salmonid Population thresholds” described above. Include abundance and/or escapement estimates for as many years as possible.**

As described above, the critical threshold value could not be accurately estimated due to the short time series of data that exists for the populations in question. A review of other steelhead populations and their critical threshold values suggested that, until additional data is gathered, an interim critical threshold of 100 wild summer steelhead passing Powerdale Dam be adopted as threshold numbers to trigger additional conservation actions. Summer steelhead escapement levels have been less than the critical threshold level one year during the period of record and the critical threshold has never been reached (Table 2). A similar process was used to estimate critical threshold level for wild winter steelhead. Based on these analysis, we propose an interim wild winter steelhead critical threshold of 200 individuals measured as escapement above

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Powerdale Dam. Wild winter steelhead returns have been lower than the proposed interim critical population threshold one year during the period of record (Table 3).

Estimates of both summer and winter steelhead escaping upstream from Powerdale Dam exist for years since 1992. Estimated escapement of wild summer steelhead escaping past Powerdale Dam ranges from 477 to 65 and averages 195 for the period of record (Tables 2). Estimated escapement of wild winter steelhead passing Powerdale Dam ranges from 678 to 194 and averages 336 for the period of record (Table 3).

**Table 1. List of the natural fish populations, “Viable Salmonid Population” thresholds, and associated hatchery stocks included in this FMEP.**

Natural Populations (or Management Units)	Critical Thresholds	Viable Thresholds	Associated hatchery stock(s)	Hatchery stock essential for recovery? (Y or N)
Hood River Wild Winter Steelhead	70	200	Hood River Winter Steelhead stock, lot50	N
Hood River Wild Summer Steelhead	35	100	Hood River Summer Steelhead stock, lot 50	N

Table 2. Migration timing of summer steelhead captured at the Powerdale Dam trap by origin and run year. Bi-monthly counts are reported from March through December.

Origin, Run Year	March		April		May		June		July		August		September		October		November		December		Jan- May	Total	
	01-15	16-31	01-15	16-30	01-15	16-31	01-15	16-30	01-15	16-31	01-15	16-31	01-15	16-30	01-15	16-31	01-15	16-30	01-15	16-31			
Wild,																							
1992-93	0	1	12	6	7	21	31	68	49	49	37	18	17	55	25	24	38	12	2	1	4	477	
1993-94	0	1	10	5	8	21	13	21	25	26	14	10	8	5	11	8	1	1	10	0	30	228	
1994-95	0	1	3	4	9	7	22	25	32	33	11	1	4	8	2	7	5	0	0	0	9	183	
1995-96	0	0	0	0	2	1	4	6	37	19	16	2	5	5	2	8	0	8	0	0	7	122	
1996-97	0	0	0	1	3	3	12	17	31	31	14	6	6	5	17	10	7	0	1	0	5	169	
1997-98	0	0	0	0	1	1	1	4	6	6	14	2	4	7	9	2	8	0	0	0	0	65	
1998-99	0	0	0	1	3	2	6	13	15	17	7	5	5	7	7	4	3	13	1	0	10	119	
1999-00 a/	0	0	1	0	1	5	7	6	19	28	11	5	0	8	8	2	35	8	2	0	N/A	146	
2000-01 a/	0	0	0	4	8	10	11	41	27	21	14	11	10	23	0	30	2	0	0	0	N/A	212	
Subbasin Hatchery,																							
1992-93	0	8	48	82	131	191	136	279	253	220	136	28	26	55	24	10	15	4	1	4	19	1,670	
1993-94	0	1	13	38	83	120	75	156	194	169	115	34	24	8	17	10	0	1	11	1	23	1,093	
1994-95	0	4	14	80	128	171	281	308	329	169	24	10	13	17	18	12	13	4	0	0	20	1,615	
1995-96	0	0	4	0	5	12	30	33	220	104	68	13	15	6	9	5	1	12	0	2	6	535	
1996-97	0	2	40	29	124	156	317	191	268	130	30	15	5	3	9	7	4	0	0	0	7	1,338	
1997-98	0	0	0	11	36	59	23	66	109	68	112	21	17	25	9	3	2	0	0	0	3	564	
1998-99	0	2	2	21	20	25	88	60	111	103	16	12	19	15	5	7	2	10	0	0	7	525	
1999-00 a/	0	0	3	9	2	31	20	64	75	121	65	20	3	3	7	2	10	1	0	0	N/A	436	
2000-01 a/	1	12	59	60	67	157	152	246	174	118	49	32	34	19	0	15	6	0	0	0	N/A	1,221	
Stray Hatchery,																							
1992-93	0	0	0	0	2	3	0	2	6	4	3	0	4	16	0	4	5	0	0	0	7	56	
1993-94	0	0	0	1	0	0	2	2	7	0	1	3	0	0	1	0	0	0	1	0	1	19	
1994-95	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5	
1995-96	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	1	1	0	0	0	8	
1996-97	0	0	0	0	0	0	3	2	5	2	1	2	0	0	1	5	1	0	0	0	2	20	
1997-98	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	1	0	0	0	0	6	
1998-99	0	0	0	0	0	0	0	0	0	1	0	0	2	5	1	0	0	0	0	0	1	10	
1999-00 a/	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	N/A	2	
2000-01 a/	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Unknown,																							
1992-93	1	2	1	0	1	0	1	1	2	2	1	1	0	1	2	0	2	0	0	1	0	19	
1993-94	0	0	0	0	1	0	0	3	5	0	0	2	0	1	0	0	0	0	0	1	3	16	
1994-95	0	0	0	4	2	4	4	7	11	7	1	0	11	0	0	1	1	0	0	0	1	54	
1995-96	0	0	0	0	0	0	1	2	5	3	7	0	0	0	0	0	0	1	0	0	1	20	
1996-97	0	0	0	0	1	3	1	1	1	5	1	0	2	2	1	2	0	0	0	1	1	20	
1997-98	0	0	1	0	4	4	2	5	7	4	9	1	2	1	1	0	2	0	1	0	0	44	
1998-99	0	0	0	4	5	3	3	3	4	6	2	0	0	1	2	2	2	3	1	1	3	45	
1999-00 a/	0	0	0	0	0	1	2	2	12	8	2	0	0	1	0	1	3	1	8	0	N/A	41	
2000-01 a/	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

a/ Preliminary estimates. Not possible to assign definitive origin. Origin assigned based on fin mark.

Table continues

Table 2. Migration timing of summer steelhead captured at the Powerdale Dam trap by origin and run year. Bi-monthly counts are reported from January through May.

Origin, Run Year	Mar-Dec	January		February		March		April		May		Total
		01- 15	16-31	01-15	16-29	01-15	16-31	01-15	16-30	01-15	16-31	
Wild,												
1992-93	473	0	1	0	0	1	1	0	0	1	0	477
1993-94	198	16	2	0	1	2	1	2	6	0	0	228
1994-95	174	0	0	5	1	1	1	1	0	0	0	183
1995-96	115	0	0	0	0	1	0	1	5	1	0	122
1996-97	164	0	0	0	4	0	1	0	0	0	0	169
1997-98	65	0	0	0	0	0	0	0	0	0	0	65
1998-99	109	7	0	0	0	1	1	0	1	0	0	119
1999-00	158	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Subbasin Hatchery,												
1992-93	1,651	0	0	0	0	0	3	11	4	1	0	1,670
1993-94	1,070	4	2	0	0	1	2	7	7	0	0	1,093
1994-95	1,595	0	4	2	3	6	2	0	3	0	0	1,615
1995-96	529	0	0	0	0	4	0	1	1	0	0	535
1996-97	1,331	0	0	0	3	0	1	2	1	0	0	1,338
1997-98	578	0	0	0	0	0	0	1	0	0	0	579
1998-99	518	5	0	1	0	0	0	0	1	0	0	525
1999-00	478	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stray Hatchery,												
1992-93	49	0	1	1	0	1	1	3	0	0	0	56
1993-94	18	0	0	0	0	0	0	1	0	0	0	19
1994-95	4	0	0	0	0	0	0	1	0	0	0	5
1995-96	8	0	0	0	0	0	0	0	0	0	0	8
1996-97	22	0	0	0	1	0	0	0	1	0	0	24
1997-98	6	0	0	0	0	0	0	0	0	0	0	6
1998-99	9	0	0	1	0	0	0	0	0	0	0	10
1999-00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unknown,												
1992-93	18	0	0	0	0	0	0	0	0	0	0	18
1993-94	13	1	0	0	0	0	0	0	2	0	0	16
1994-95	53	0	0	0	0	0	0	1	0	0	0	54
1995-96	19	0	0	0	0	0	0	0	1	0	0	20
1996-97	19	0	0	0	0	0	1	0	0	0	0	20
1997-98	44	0	0	0	0	0	0	0	0	0	0	44
1998-99	42	3	0	0	0	0	0	0	0	0	0	45
1999-00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2000-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



Table 3. Bi-monthly counts of upstream migrant adult winter steelhead at Powerdale Dam, Hood River, by run year.

Origin, Run Year	December		January		February		March		April		May		June		Total
	01-15	16-31	01-15	16-29	01-15	16-31	01-15	16-30	01-15	16-30	01-15	16-31	01-15	16-30	
Wild,															
1991-92	0	0	0	24	28	32	75	98	153	149	88	29	2	0	678
1992-93	0	4	0	2	3	0	28	61	99	78	86	30	3	2	396
1993-94	0	0	4	7	0	6	23	25	77	128	76	21	11	0	378
1994-95	0	0	0	0	9	0	6	2	55	15	52	44	10	1	194
1995-96	0	0	0	0	0	0	17	4	93	40	69	36	11	0	270
1996-97	0	2	1	0	3	13	5	22	52	72	68	33	3	0	274
1997-98	1	0	1	1	6	0	7	12	23	107	36	8	5	1	208
1998-99	0	0	13	0	4	2	8	32	47	121	22	33	7	1	290
1999-00															
Subbasin Hatchery,															
1991-92	0	5	15	114	59	49	33	5	2	2	0	0	0	0	284
1992-93	2	15	0	34	48	0	42	32	18	13	3	0	0	0	207
1993-94	0	0	29	32	8	37	33	5	3	2	0	0	0	0	149
1994-95	0	0	0	6	31	19	11	4	24	3	6	1	0	0	105
1995-96	2	0	0	0	0	0	21	8	97	49	66	21	3	0	267
1996-97	0	0	0	1	2	43	21	54	131	175	144	53	8	0	632
1997-98	6	0	1	0	6	4	26	48	82	142	26	5	1	0	347
1998-99	17	0	9	0	4	0	6	63	75	90	12	23	1	2	302
1999-00															
Stray Hatchery,															
1991-92	0	0	0	3	5	1	6	6	7	3	1	1	0	0	33
1992-93	0	1	0	4	3	0	3	9	7	1	1	0	0	0	29
1993-94	0	0	2	1	0	0	2	3	11	8	0	0	0	0	27
1994-95	0	1	0	0	0	1	1	1	0	0	1	0	0	0	5
1995-96	0	0	0	0	0	0	3	1	2	3	0	0	0	0	9
1996-97	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
1997-98	0	0	0	0	0	2	0	8	4	5	0	0	0	0	19
1998-99	0	0	2	0	0	0	0	4	1	0	0	0	0	0	7
1999-00															

Table3 (continued). Bi-monthly counts of upstream migrant adult winter steelhead at Powerdale Dam, Hood River, by run year.

Origin, Run Year	December		January		February		March		April		May		June		Total
	01-15	16-31	01-15	16-29	01-15	16-31	01-15	16-30	01-15	16-30	01-15	16-31	01-15	16-30	
Unknown,															
1991-92	0	0	0	1	1	0	2	3	3	7	3	1	0	0	21
1992-93	1	1	0	1	1	0	2	4	3	2	2	0	0	0	17
1993-94	0	0	1	1	0	0	4	8	5	3	3	2	0	0	27
1994-95	0	0	0	0	2	2	1	0	2	1	2	2	2	0	14
1995-96	0	0	0	0	0	0	0	1	5	0	5	3	0	0	14
1996-97	0	0	0	0	0	0	0	6	5	3	4	2	0	0	20
1997-98	0	0	0	0	0	4	9	2	11	11	5	1	0	0	46
1998-99	2	0	1	1	0	0	1	2	7	7	1	2	0	0	24
1999-00															

#### **1.4) Harvest Regime**

The primary focus of this FMEP is on fisheries that target hatchery adult winter and summer steelhead. The majority of potential fishery-related impacts to wild steelhead are thought to occur in these fisheries. Sport angling impacts to ESA listed Chinook salmon are addressed in the Lower Columbia River ESU Chinook FMEP and this document concludes that Hood River sport angler impacts on listed Chinook are immeasurably small.

The Oregon Department of Fish and Wildlife will manage fisheries in the Hood River subbasin to selectively harvest adult hatchery steelhead. The selective fisheries on hatchery steelhead require the mandatory release of incidentally caught wild fish. This regime has been structured and implemented over a number of years to provide highly significant protection to both adult and juvenile steelhead. The modification of certain hatchery programs for winter and summer steelhead has significantly reduced, but not eliminated the potential for fishery impacts to native wild steelhead adults and juveniles. ODFW believes the proposed harvest regime will not jeopardize the survival and recovery of the ESA listed steelhead in the Hood River.

##### **1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status.**

Current escapement objectives for Hood River steelhead are calculated as escapement past Powerdale Dam and are measured at the Powerdale trap. The overall goal of the HRPP is to re-establish or rebuild naturally sustaining anadromous salmonid runs in the Hood River basin via a combination of supplementation, habitat improvements, and a monitoring and evaluation program (BPA, et al 1996). Numeric run size goals for the HRPP were developed early in the project and will be reevaluated through time as additional carrying capacity information gathered by the monitoring and evaluation portion of the project becomes available. Additionally, the escapement goals contained in the HRPP are based, in part, on production increases made possible by extensive habitat improvement activities.

In the following discussion we use the term fishery mortality rate rather than exploitation rate to clarify that under current wild catch and release regulation a small fraction of the fish that are caught are actually removed from the spawning population.

Total fishing mortality rates of naturally produced steelhead at the escapement levels detailed above are currently not described but are likely less than 2% for the following reasons. Mandatory wild steelhead release regulations have been effect since 1 January, 1991. Sport angler fishing mortality is limited to hook and release mortality. Tribal exploitation rates will be negotiated under the framework of the HRPP. Fishing mortality rates for wild steelhead for current run sizes and under current harvest management, therefore, are limited to non-tribal sport caught hook and release mortality.

Hook and release fishing mortality rates specific to Hood River steelhead, salmon and trout fisheries are unknown but assumed to be less than 5% per hooking event due to the relatively cold water temperature regimes present in Hood River as compared to most other steelhead rivers.

The best available scientific information suggests hook and release mortality of adult steelhead is low. Hooton (1987) found catch and release mortality of adult steelhead to be 3.4% (n= 3,715 fish) on average when using a variety of fishing tackle, including barbed and barbless hooks, bait and artificial lures. Hooton concluded that catch and release of adult steelhead was an effective mechanism for maintaining angling opportunity without negatively impacting stock recruitment. Reingold (1975) showed adult steelhead hooked, played to exhaustion, and then released returned to their target spawning stream as well as steelhead not hooked and played to exhaustion.

As stated earlier, colder water temperatures are widely thought to result in lower hook and release mortality (Hooton 1987). Conversely, Catch and release mortality during periods of elevated water temperature are likely to result in post-release mortality rates greater than reported by Hooton (1987).

In a study conducted on the catch and release mortality of steelhead in a California river, Taylor and Barnhart (1999) reported over 80% of the observed mortalities occurred at stream temperatures greater than 21 °C. However, water temperatures greater than 20 °C were not measured in the lower reaches of the Hood River in water years 1995 and 1996. In fact, most sites monitored for water temperature were several degrees C. colder (PacifiCorp 1998).

The US v. Oregon Technical Advisory Committee typically applies a catch and release mortality rate of 10% for salmon and steelhead fisheries in the mainstem Columbia River and tributaries during high stream temperatures. Such warm water conditions are rarely reached in the Hood River basin.

Managers on the Hood River have had extensive experience with and observations of hook and release fisheries on both the Hood and Deschutes rivers. Although these experiences are qualitative rather than quantitative, these experiences and observations suggest that hook and release mortality on the Hood River is very low and likely less than 5%.

Estimates of steelhead harvest by sport anglers from the mouth upstream to Powerdale Dam are available for both summer and winter steelhead for run years 1996-97 to 1998-99 (Olsen and French 2000). Estimates of the number of steelhead returning to the mouth of the Hood River are also available for those years. Utilizing these data, an average catch rate of 35% can be established for all groups of steelhead caught in Hood River fisheries. Applying the 5% hook and release mortality rate as estimated by Hooton (1987) and discussed above, we estimate that 1.7% of the average return to the river each year would succumb to hook and release mortality.

Olsen and French (1999) further estimate, based on harvest census conducted by their project, that illegal harvest, whether intentional or unintentional, of wild steelhead during the above mentioned years is estimated to be 0.67% of the average steelhead escapement to the subbasin. Measures to reduce this illegal take will be discussed below.

**1.4.2) Description of how the fisheries will be managed to conserve the weakest population or management unit.**

Sport steelhead angling in the Hood River is currently managed to provide significant protection to the listed wild stocks.

Mandatory wild release regulations for adult steelhead have been in effect in the Hood River since 1 January 1991 and will continue into the foreseeable future. Additionally, large portions of the Hood River subbasin were closed to all angling in 1999. Steelhead and salmon angling is currently restricted to the 4.5 miles of river from the mouth upstream to Powerdale Dam.

As discussed in Section 1.4.1 above, fishing mortality rates on wild steelhead stocks in the Hood River subbasin will be restricted hook and release mortality (estimated at less than 5% per hooking event) under this FMEP. The cumulative effect will be that less than 2% of the annual wild steelhead return to the Hood River will be lost to hook and release mortality as a result of sport angling.

Angling regulations currently in place throughout large portion of the Hood River watershed provide significant protection to juvenile salmon and steelhead. All trout fishing in Hood River and tributaries open to angling (the West Fork Hood River and all tributaries are closed to angling year around) is restricted to late May to 31 October. Trout fishing in the Hood River subbasin is further restricted to catch and release angling with only artificial lures permitted as terminal tackle. This artificial lure, catch and release regulation is in place in 69.8% of the Hood River watershed. Additionally the West Fork Hood River and tributaries, which make up the remaining 30.2% of the total watershed area, are closed to all angling. These regulations are believed to provide a high degree of protection to juvenile steelhead.

Natural bait was legal in much of the Hood River watershed during the general trout season (end of May through October) until 1999. Since hooking mortality studies have shown bait to result in significantly higher mortality rates than other gear types, there was concern that using bait could be off-setting the benefits of having a catch and release wild trout fishery. Wydoski (1977) showed the average mortality of trout when using bait to be more than four times greater than the mortality associated with using artificial lures and flies. Taylor and White (1992) showed average mortality of trout to be 31.4% when using bait versus 4.9% and 3.8% for lures and flies, respectively. Schisler and Bergersen (1996) reported average mortality of trout caught on passively fished bait to be higher (32%) than mortality from actively fish bait (21%). Mortality of fish caught on artificial flies was only 3.9%.

Hatchery catchable rainbow stocking in the East Fork Hood River was eliminated after 1996. The most significant effect of releasing catchable trout in waters home to listed steelhead is the inadvertent harvest of juvenile steelhead in catchable trout fisheries. Cramer et al. (1997) observed that the release of catchable trout attracts anglers to release locations and that harvest rates of juvenile steelhead are generally proportional to angler effort. In a study of effects to juvenile steelhead from catchable trout fisheries in the Wenatchee River, Washington, Don Chapman Consultants (1989) concluded that sport anglers remove 61% to 87% of wild steelhead longer than 125 mm and kill 2% to 28% of steelhead larger than 100 mm by hook and release. Furthermore, it was found that anglers harvest 72% to 91% of the hatchery rainbow trout soon after release. Cramer et al. (1997) noted that this quick removal of hatchery trout leaves only juvenile steelhead as the targets for fishermen attracted by the reports of high angler success. This observation is supported by Don Chapman Consultants (1989) finding that “although catchable trout did not displace wild steelhead by direct interaction for space, hatchery trout attracted anglers that killed a large fraction of the juvenile steelhead in the river.” Their underwater observations also indicated that wild steelhead were more susceptible to angling than hatchery trout because steelhead reacted faster to lures and bait. Pollard and Bjornn (1973) made similar observations, noting in a study on the Crooked Fork of the Lochsa River, Idaho, that most of the larger juvenile steelhead trout present in the retention area of the river were caught at a faster rate than the smaller age 1 steelhead and the hatchery trout given the same level of effort.

Fisher (1961, as described by Cramer et al. 1997) surveyed angler effort in the Big Sur River, California, observing that anglers caught an estimated 90% of the catchable trout released, but wild trout made up 24% of total catch. The angler catch of wild fish was 7 times greater than the number of wild fish counted as outmigrants to the river during the same period. This experiment was conducted during the peak spring migration period for steelhead smolts. All these studies show that natural steelhead are more susceptible to angling than catchable trout when the two are present together and that angler effort is directly related to the presence of catchable trout releases. These studies lead to the conclusion that removing the catchable trout program from the East Fork Hood River will benefit ESA listed steelhead.

All trout fishing in the Hood River subbasin is catch and release. Impacts then, are limited to post-release mortality associated with catch and release fishing. Additional steelhead smolt protection is provided by the late May trout season opener for waters both above and below Powerdale Dam. Fishing effort is currently much lower than in previous years because of the elimination of hatchery catchable trout stocking in the East Fork Hood River and the conservative, selective fishing regulations currently in place. It is difficult to quantify the impacts to juvenile steelhead from sport fishing because of the lack of information specific to the Hood River. However, given the current regulations that are in place for juvenile steelhead, the dispersed nature of the fishery and cessation of trout stocking after 1996, it is estimated that <1% or rearing juvenile steelhead in the Hood River subbasin are caught and released in the trout fishery.

Chinook and coho salmon are also present in the Hood River and are subject to sport harvest from Powerdale downstream to the mouth of the Hood River. Coho are legal to retain the entire year while Chinook can only be retained by sport anglers from 1 August to 31 December each year. Relatively few coho and fall Chinook return to the Hood River and little or no target sport fishery exists for these species. Gear restrictions in place to minimize mortality on juvenile wild steelhead apply when angling for these fishes, regardless of time of year. The presence of these species and any angling for them likely does not contribute to measurable additional mortality to listed steelhead. Sport angling to ESA listed Chinook salmon are addressed in the Lower Columbia River ESU Chinook FMEP.

As described in Section 1.3.1 above, this FMEP proposes interim viable threshold values of 100 wild summer steelhead and 200 wild winter steelhead and interim critical thresholds of 35 wild summer steelhead and 70 wild winter steelhead. If the viable threshold values are reached for either species, then additional time, area and/or fishing gear restrictions would be proposed to further reduce sport hook and release mortality to the affected wild steelhead. If the critical threshold values are reached for either species, total closure of Hood River to all angling during the period needed to protect the appropriate fish would likely be proposed.

**1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of commingled natural-origin populations in areas where artificially propagated fish predominate.**

The Hood River steelhead harvest strategy is based solely on harvest of fin marked, hatchery origin steelhead. Only steelhead with a missing adipose fin can legally be retained by sport anglers. No hatchery steelhead deemed essential to the survival of the species have been documented in Hood River. Season and area closures, gear restrictions, and a consistently high level of wildlife law enforcement all combine to minimize the loss of wild steelhead in the subbasin.

**1.5) Annual Implementation of the Fisheries**

The steelhead fishery is open year around in the current fishery management strategy. Only hatchery origin steelhead are legal to retain and these fish are provided to maintain catch and harvest opportunities greater than which the wild population can sustain. It is anticipated that the fishery will continue to remain open on a 12 month basis. Harvest of wild steelhead is not proposed in this FMEP.

The Oregon Fish and Wildlife Commission (Commission) adopts angling regulations every year with an extensive public involvement process every four years. This process begins about one year in advance of when specific regulations are actually adopted. Current regulations require release of wild (unmarked) steelhead in the Hood River and trout fisheries are designed to protect juvenile steelhead (catch and release, no bait allowed).

There is also a process in place to implement regulations on a much shorter time schedule than every four years that addresses emergency conditions. Such emergency regulations can be adopted by the Commission within 2 weeks if a Commission meeting is scheduled near the same date. The Commission has also delegated to the Director of ODFW the authority to adopt emergency regulations. If the Director adopts emergency regulations, they can be implemented within a matter of days from the time they are submitted. ODFW will consult with NMFS regarding the proposed regulations changes prior to implementation to ensure that effects on listed LCR steelhead will be consistent with limitations described in this FMEP.

## SECTION 2. EFFECTS ON ESA-LISTED SALMONIDS

### **2.1) Description of the biologically-based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESU(s) in the wild.**

The objective of the proposed harvest regime is to ensure that harvest of hatchery steelhead is consistent with the recovery of the listed population. Data sufficient to construct spawner/recruit modeling, identify either the viable or critical threshold, or conduct Chilcote's Population Viability Analysis (Chilcote, 2001) do not currently exist for the Hood River population. The conservative in-river harvest strategies proposed in this FMEP are thought to meet the objective of population recovery. Because the proposed fishery management strategies result in fishery mortality rates (<2%) that are substantially less than the 20% maximum fishery mortality rate recommend by Chilcote (2001) for populations of steelhead in Oregon, the proposed fishery should not reduce the likelihood of survival and recovery of the affected population. Chilcote (2001) found that the probability of extinction for nearly all steelhead populations modeled throughout Oregon was found to be zero when harvest rates were restricted to 20% or less.

It is likely that more accurate viable and critical values can be estimated for Hood River populations after additional data is collected. Given the nature of the data collected, long time series may not be needed. The HRPP monitoring and evaluation program collects data that are accurate, precise and robust. For example, all adults escaping to Powerdale trap are counted with precision. Age data is collected from each escaping adult making assignment of brood year possible for wild steelhead. Harvest estimates from the mouth upstream to Powerdale Dam are generated to account for angler harvest of hatchery steelhead, making accurate smolt to adult return calculations possible. Estimated of the number of outmigrating juvenile steelhead are made for each fork and the mainstem Hood River to estimate juvenile production and carrying capacity. Additionally, the Technical Review Team will make important contributions to the process of identifying future estimates of the viable and critical threshold levels.

Any fisheries management strategy that includes harvest has both direct and indirect harvest. Direct harvest takes place when legally caught fish are retained as part of the daily limit. This FMEP does not propose direct harvest of wild steelhead in the Hood River. This FMEP focuses



on maintaining wild harvest (hook and released) rates that are consistent with recovery of the population. The small hook and release mortality rates to Hood River steelhead covered under this plan are not expected to exert selective pressure on any single characteristic that will affect genetic diversity.

Estimates of steelhead harvest by sport anglers from the mouth upstream to Powerdale Dam are available for both summer and winter steelhead for run years 1996-97 to 1998-99 (Olsen and French 2000). Estimates of the number of steelhead returning to the mouth of the Hood River are also available for those years. Utilizing these data, an average catch rate of 35% can be established for all groups of steelhead caught in Hood River fisheries. Applying the 5% hook and release mortality rate as estimated by Hooton (1987) and discussed above, we estimate that 1.7% of the average return to the river each year may succumb to hook and release mortality.

All trout fishing in the Hood River subbasin is catch and release. Impacts then, are limited to post-release mortality associated with catch and release fishing. Additional steelhead smolt protection is provided by the late May trout season opener for waters both above and below Powerdale Dam. Fishing effort is currently much lower than in previous years because of the elimination of hatchery catchable trout stocking in the East Fork Hood River and the conservative, selective fishing regulations currently in place. West Fork Hood River and tributaries are closed to all angling creating a very significant sanctuary for juvenile and adult steelhead. It is difficult to quantify the impacts to juvenile steelhead from sport fishing because of the lack of information specific to the Hood River. However, given the current regulations that are in place for juvenile steelhead, the dispersed nature of the fishery and cessation of trout stocking after 1996, it is estimated that <1% or rearing juvenile steelhead in the Hood River subbasin are caught and released in the trout fishery.

As demonstrated above, harvest rates of listed Hood River steelhead proposed by this FMEP will not reduce the likelihood of survival and recovery of steelhead in the Hood River. Even modeling hook and release mortality for Hood River wild steelhead using a more conservative 10% hooking mortality rate produces estimated mortality that would not jeopardize the population's chance of survival and recovery. Additionally, the very conservative protection strategies consisting of time and area closures, gear restrictions and mandatory wild fish release discussed above combine to offer both adult and juvenile steelhead highly significant protection from angler induced mortality.

#### **2.1.1) Description of which fisheries affect each population (or management unit).**

Upstream migrating adult steelhead are present year round in the FMEP management area. Additionally, the reach of river from the mouth upstream to Powerdale Dam is open to steelhead angling year round. Sport angling for steelhead has one major activity period in the Hood River, however. Winter steelhead are present in fishable numbers starting in February and continuing through May. Bright summer steelhead enter the Hood River in March and continue throughout the summer. Angler effort peaks in May and June in response to this overlapping abundance. The Hood River becomes turbid from glacier meltwater contributed by the East Fork and Middle

Fork by early July each year and angler effort decreases dramatically. Clear water usually returns by mid-October of each year but angler interest remains low until the following February when good numbers of winter steelhead arrive.

Angling for adult steelhead is open year around from Powerdale Dam downstream 4.5 miles to the Columbia – Hood River confluence. This fishery is the only opportunity in the subbasin for sport anglers to fish for adult steelhead. Access to the Hood River in this reach is generally poor. The majority of the reach is in a roadless canyon and foot travel is required. Furthermore, the Hood River in this reach is a relatively high gradient, large free stone river, making steelhead angling challenging. Much of the historically large steelhead harvest in the Hood River subbasin took place in areas that are now closed to steelhead angling. Juvenile steelhead principally use the Powerdale Dam to the mouth reach as a migration corridor. They are likely present there only during the relatively brief migration period and are likely not exposed to hooking mortality levels that would jeopardize the survival of the population.

All trout angling upstream from Powerdale Dam is restricted to a late May opener to protect smolts, is catch and release only and no natural bait is allowed. In addition, trout angling is lightly dispersed throughout the basin since no trout stocking has occurred after 1996. It is estimated that less than 1% of rearing juvenile steelhead in the basin are caught and released in the trout fishery. This artificial lure, catch and release regulation is in place in 69.8%% of the Hood River watershed area. Additionally the West Fork Hood River and tributaries, which make up 30.2% of the total watershed area, are closed to all angling. These regulations are believed to provide a high degree of protection to juvenile steelhead.

These restrictions are felt to maintain hook and release mortality to juvenile steelhead to levels well below those that would jeopardize the survival of the population.

Chinook and coho salmon are also present in the Hood River and are subject to sport harvest from Powerdale downstream to the mouth of the Hood River. Coho are legal to retain the entire year while Chinook can only be retained by sport anglers from 1 August to 31 December each year. Relatively few coho and fall Chinook return to the Hood River and little or no target sport fishery exists for these species. Gear restrictions in place to minimize wild steelhead mortality apply when angling for these fishes, regardless of time of year. The presence of these species and any angling for them likely does not contribute to measurable additional mortality to listed steelhead. Sport angling to ESA listed Chinook salmon are addressed in the Lower Columbia River ESU Chinook FMEP.

**2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs.**

The current and proposed harvest regime for Hood River steelhead, trout and salmon has not and will not result in changes to the biological characteristics of wild Hood River steelhead. These characteristics have been and will continue to be monitored by the monitoring and evaluation

component of the HRPP. Mandatory wild steelhead release regulations have been in effect for 10 years and will likely remain in effect for the term of this FMEP. Mortality to Hood River wild adult steelhead by sport anglers, as a result of incidental hook and release mortality, has not and will not affect the biological characteristics of the listed steelhead.

Any fisheries management strategy that includes harvest has both direct and indirect harvest. Direct harvest takes place when legally caught fish are retained as part of the daily limit. This FMEP does not propose direct harvest of wild steelhead in the Hood River. This FMEP focuses on maintaining wild harvest (hook and released) rates that are consistent with recovery of the population. The small hook and release mortality rates to Hood River steelhead covered under this plan are not expected to exert selective pressure on any single characteristic that will affect genetic diversity.

### **2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated to occur under the harvest regime in this FMEP.**

Harvest rates of adult steelhead in Hood River prior to the start of mandatory wild release regulations on 1 January 1991 are unknown. Cramer et al (1997) reviewed harvest rates of adult steelhead in sport fisheries in Oregon and Washington prior to wild release regulations and concluded that harvest rates on wild winter and summer steelhead were in the neighborhood of 50%. Harvest rates in Hood River could have been of this magnitude.

Harvest rates for adult steelhead specific to the subbasin are for available return years 1996 through 1999 (Olson and French 2000). Mandatory wild steelhead release rules were in effect these years. Based on run size and catch rates from Olson and French (2000), we estimate that less than 2% of any annual wild steelhead run would potentially be lost from incidental hook and release mortality in the adult steelhead fishery (see Section 1.4.1). We anticipate that harvest impacts under the FMEP harvest regime will be very small and identical to the less than 2% calculated above and certainly much less than the estimated 50% prior to wild release regulation.

Past harvest impacts to juvenile steelhead as a result of trout fisheries in the Hood River are unknown. Cramer et al (1997) were of the opinion that the greatest sport harvest of steelhead in recent times may have been on juveniles taken in trout fisheries, rather than on adults. This was likely the case in Hood River considering the regulations and management practices in place for many years. For example, trout season opened in Hood River and tributaries in late April until after 1979 when the late May season was adopted to provide a degree of steelhead smolt protection. East Fork Hood River was stocked with catchable rainbow trout to support a consumptive trout fishery until 1996. Neal Creek, a mainstem Hood River tributary believed to be an important winter steelhead spawning and rearing stream, was also stocked with catchable trout until 1994. Natural bait was allowed for trout fishing until after 1998. After 1998, all trout fishing in the subbasin has been mandatory catch and release of trout and no bait is allowed.

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West Fork Hood River and all tributaries were closed to all angling as a sanctuary area after 1998. The more restrictive angling regulations presently in place provide significantly greater protection to juvenile steelhead from angling mortality. Cramer et al (1997) estimated that the rate of angling mortality to juvenile steelhead in the East Fork Hood River dropped from 62% to 18% from 1995 to 1998, the greatest drop in angler induced mortality seen in their study streams.

Angling regulations currently in place cause much lower harvest impacts to both adult and juvenile steelhead than past regimes. The only remaining regulatory option that would offer greater protection from angling mortality is complete closure of Hood River to all angling.

#### **2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous year and the impacts expected in the future.**

Other fisheries that could impact total mortality of Hood River steelhead include Zone 6 Columbia River treaty fisheries and sport fisheries in the Columbia River downstream from the Hood River – Columbia confluence. Mortality associated with the Zone 6 summer commercial seasons has averaged 8.3% for the last 5 years. An agreement has been reached with the treaty tribes fishing in Zone 6 to limit harvest of steelhead in the Zone 6 fishery to less than 15% (ODFW 2000). The combined Zone 6 treaty and mainstem Columbia sport fishery mortality has averaged 9.6% for the last 6 years (Chilcote 2001 and ODFW and WDFW 2000). Zone 6 mortality from the winter commercial season is unknown but may be less than the 8.3% cited above due to a tendency for tribal fishers to target sturgeon during the winter season. Gill net fisheries that target sturgeon commonly use sunken or diver nets with large mesh sizes while gill net fisheries that target steelhead use floating nets and small mesh.

Mandatory wild release regulations are in effort for sport steelhead angling in the Columbia River. Hook and release mortality associated with this fishery is expected to remain at or near 5% for winter steelhead 10% for summer steelhead into the future.

Combined fishing mortality rate of wild Hood River steelhead in the Zone 6 tribal, Columbia sport and Hood River sport fisheries is estimated to be less than 12%. Chilcote (2001) found that the probability of extinction for nearly all steelhead populations modeled throughout Oregon was found to be zero when harvest rates were restricted to 20% or less.

## SECTION 3. MONITORING AND EVALUATION

### **3.1) Description of the specific monitoring of the “Performance Indicators” listed in section 1.1.1.**

The performance indicators for wild escapement will be measured as counts of naturally produced steelhead past Powerdale Dam. An upstream migrant adult fish trap (Powerdale trap) was installed by the Oregon Department of Fish and Wildlife at Powerdale Dam in December 1991. Powerdale Dam, which is owned and operated by PacifiCorp, is located at river mile 4.5 in the mainstem Hood River. The original trap facility installed in 1991 and a new facility put on line in early 1997, are components of the monitoring and evaluation portion of the HRPP. The Powerdale trap allows for total counts of all upstream migrating fishes and will be a key component in meeting and measuring not only the objectives of this FMEP but the goals and objectives of the HRPP (tables 2 and 3).

The performance indicator for harvest management will be steelhead harvest and catch estimates based on angler effort, harvest and catch data collected in the lower 4.5 miles of the Hood River.

These data will be collected as part of a statistical harvest program associated with the monitoring and evaluation of the HRPP. Data are collected on landings of wild and hatchery steelhead by sport anglers.

Tribal fishers do not currently harvest steelhead in the Hood River. Harvest sharing agreements yet to be formalized between ODFW and the Confederated Tribes of Warm Spring Reservation of Oregon (CTWSRO) will identify specific allocation of returns above escapement needs and location of Indian and non-Indian fisheries in the Hood River (O’Toole and ODFW, 1991). If tribal fishers do start to harvest steelhead in the Hood River, statistical harvest surveys will be initiated to estimate their steelhead harvest.

Monitoring of the performance indicators listed in Section 1.1.1 will be refined with additional collection of data under the HRPP. Given the nature of the data collected, long time series may not be needed. The HRPP monitoring and evaluation program collects data that are accurate, precise and robust. For example, all adults escaping to Powerdale trap are counted with precision. Age data is collected from each escaping adult making assignment of brood year possible for wild steelhead. Harvest estimates from the mouth upstream to Powerdale Dam are generated to account for angler harvest of hatchery steelhead, making accurate smolt to adult return calculations. Estimated of the number of outmigrating juvenile steelhead are made for each fork and the mainstem Hood River to estimate juvenile production and carrying capacity. Additionally, the Technical Review Team will make important contributions to the process of monitoring the identified performance indicators.

**3.2) Description of other monitoring and evaluation not included in the Performance Indicators (section 3.1) which provides additional information useful for fisheries management.**

Extensive trapping of downstream migrating rainbow-steelhead currently takes place in the Hood River subbasin as a component of the monitoring and evaluation of the HRPP. Estimates of the number of rainbow-steelhead migrants passing the various trap sites is made. The final trap site is just upstream from Powerdale Dam and estimates of juvenile migration past this point would be estimates of total outmigration of rainbow-steelhead from the Hood River subbasin.

While data collected to date by this effort are insufficient to establish clear relationships, smolt to adult survival rates calculated using these data will be valuable in future years as more data is collected. These data will be especially valuable to use the developing relationships between spawner escapements (escaping females) and smolt production as a method to estimate subbasin carrying capacity for steelhead.

Hatchery steelhead juveniles have been and will continue to periodically be marked with coded wire tags. Recovery of these tags both in and out of the subbasin will allow managers to more accurately characterize hatchery fish harvest levels and smolt to adult survival rates. Inferences of wild fish catch rates may also be possible from these data.

**3.3) Public Outreach**

The collection of harvest data discussed earlier is our first line of public outreach to explain our fishery management objectives and their importance in the subbasin. Harvest samplers are trained to respond correctly to questions relative to fishery regulation, the purpose and intent of these regulations and how the individual angler can help meet our management objectives. Field Office personnel have produced a variety of handout materials specific to the management objectives and management intent for Hood River steelhead over the years. These materials are made available to the harvest samplers as a point of contact handout when dealing with the angling public.

The Dalles Field Office of the Oregon Department of Fish and Wildlife, given its close proximity to and its management responsibilities on the Hood River, is another vital component of our public outreach. Field Office personnel satisfy countless phone calls, personal contacts, and correspondence detailing our management objectives each year.

Steelhead captured at the Powerdale trap are tagged before either being released upstream into the spawning grounds or recycled back to the mouth of the river to pass through the fishery again. As a result, angler recovery of tagged steelhead is a common outcome. A large number of these tags find their way back to The Dalles Field Office each season with requests for information on the tagging program. This has proven to be an excellent opportunity to inform and educate anglers on the management objective for steelhead on the Hood River.

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The Portland office of the Oregon Department of Fish and Wildlife maintains an Information and Education Division that is staffed with professionals who produce a variety of educational and outreach materials annually. Field Office personnel frequently call on Information and Education Division staff to produce news releases informing the angling public of changes in angling regulations as well as to generally inform the public of management intent.

The Oregon Sport Fishing Regulation pamphlet produced annually has proven itself to be more than a compendium of angling regulations. It has been put to a more creative use as an instrument to disseminate information on the purpose and intent of angling regulations and management objectives as well.

Finally, signage is a tried and true method of reaching anglers with a message. In addition to the traditional signage dealing with methods, bag limits, and seasons, we have incorporated signs describing our programs and their intent for many years.

### **3.4) Enforcement**

The Fish and Wildlife Division of the Oregon State Police enforces wildlife statutes and administrative rules in Oregon. Troopers assigned to the Fish and Wildlife Division check anglers for compliance with laws governing all aspects of angling on the Hood River. The Dalles Patrol Office of the Oregon State Police houses six troopers and a sergeant that have either primary or secondary responsibility to patrol the Hood River subbasin.

The Oregon State Police Fish and Wildlife Division and the Oregon Department of Fish and Wildlife maintain very close contact and enjoy an excellent and cooperative working relationship. One key component to cement and formalize that relationship is the Cooperative Enforcement Plan (CEP) process. At least once each calendar year, local representatives of both agencies formally agree on enforcement priorities, by month, and assign levels of importance to those priorities. In this way, all participants are aware of the enforcement priorities and their importance to each other.

One product of the CEP process is the formulation of specific Action Plans to deal with identified enforcement concerns. These plans detail the problem and the enforcement steps necessary to address the concern. Formal Smolt Protection Action Plans have been in place on the Hood River for several years. These Action Plans are in effect throughout the smolt migration period and have served to protect steelhead smolts through both enforcement and education.

**3.5) Schedule and process for reviewing and modifying fisheries management.**

**3.5.1) Description of the process and schedule that will be used annually to evaluate the fisheries, and revise management assumptions and targets if necessary.**

Fisheries and management assumptions discussed in this plan will be evaluated each year by Mid-Columbia District staff in consultation with appropriate Portland Headquarters and CTWSRO staff. The above-discussed suite of monitoring activities will provide adequate data at a sufficient level of detail to evaluate whether this plan is accomplishing the stated objectives. This information will be provided to NMFS' Hatcheries and Inland Fisheries Branch in Portland, Oregon, by March 31<sup>st</sup> of each year the FMEP is in effect.

**3.5.2) Description of the process and schedule that will occur every 5 years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included.**

Brood year survival for wild summer steelhead in the Hood River can be assessed every five years, given average lengths of freshwater and ocean residency. This FMEP will be evaluated every five years for effectiveness. Comprehensive reviews will be repeated at that interval until such time as the ESU is declared recovered and is delisted. Revisions to this plan will be made as performance indicators suggest that the stated objectives are not being met. Revisions will be undertaken in cooperation with appropriate Portland Headquarters and Region staff, NMFS staff, the interested public and our tribal co-managers. The Technical Review Team will be consulted during the periodic review process. Revision of this FMEP will include changes and updates in the Population Viability Analysis and viable and critical thresholds.

**SECTION 4. CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS**

The objectives and actions in this FMEP are consistent with provisions of the Columbia River Fish Management Plan (*US v Oregon*). This FMEP was developed in cooperation with the Confederated Tribes of the Warm Springs Reservation of Oregon.

This plan is consistent with applicable federal court proceedings.



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